Abstract of the Disclosure

A method and apparatus for measuring binding between a plurality of molecules of a first type and a plurality of molecules of a second type is presented. Apparatus utilizes a sensor possessing a waveguide to which have been attached in close proximity to its surface, features resembling molecules of said first type. Light is injected into said waveguide so as to produce an evanescent field at its surface. Molecules of said second type are tagged with a tag belonging to that class of chemicals which alters a characteristic of light, when said light passes through said chemical tag. Apparatus utilizes a rapid means of monitoring the change in optical signal coming from said waveguide as binding proceeds between tagged molecules of type 2 and the feature resembling molecules of type 1 on said waveguide. This allows direct measurement of binding and dissociation rates between the two types of molecules. Methods are provided whereby such data may be used to compute affinity constants, binding activity, complex affinity constants resulting from cooperativity, and kinetic parameters for the molecular pair. Preferred embodiments of the invention illustrate application of the method and apparatus to measuring binding between biological receptors and their nuclear response elements, and the use of this type of measurement for assessment of the activity of hormonal mimics present in a sample, for evaluation of pharmaceuticals intended to treat hormone dependent cancers, and for evaluation of tissue biopsy samples to detect mutant forms of the p53 protein.